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OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C.
1940 DUKE STREET
ALEXANDRIA, VA 22314

EXAMINER	
DOTE, JANIS L	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com
oblonpat@oblon.com
jgardner@oblon.com

Office Action Summary	Application No.	Applicant(s)	
	10/606,750	TODA ET AL.	
	Examiner	**Art Unit**	
	Janis L. Dote	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 November 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,7-26,28,32 and 33* is/are pending in the application.

4a) Of the above claim(s) *24-26* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,7-23,32 and 33* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) *1,7-26,32 and 33* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *8/14/07*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

1. The examiner acknowledges the cancellation of claims 30 and 31, the amendments to claims 1 and 28, and the addition of claims 32 and 33 filed on Nov. 13, 2007. Claims 1, 7-26, 28, 32, and 33 are pending.

2. Claims 24-26 have been withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicants timely traversed the restriction (election) requirement in the reply filed on Nov. 23, 2005.

Applicants are reminded that if the product claims are found to be allowable, pursuant to the procedures set forth in the Official Gazette notice dated March 26, 1996 (1184 O.G. 86), process claims 24-26, which do not depend from or otherwise include all the limitations of the allowable product, will <u>NOT</u> be rejoined.

3. The examiner has considered the copending US application listed in the "List of related cases" in the Information Disclosure Statement filed on Aug. 14, 2007.

4. The rejection of claim 30 under 35 U.S.C. 112, second paragraph, set forth in the office action mailed on Aug. 10,

2007, paragraph 6, has been mooted by the cancellation of claim 30 filed on Nov. 13, 2007.

The rejections of claims 1, 7-23, 28, 30, and 31 under 35 U.S.C. 112, first paragraph, set forth in the office action mailed on Aug. 10, 2007, paragraph 8, have been withdrawn in response to the amendments to claims 1 and 28 and the cancellation of claims 30 and 31 filed on Nov. 13, 2007.

The rejection of claims 1, 7, 8-10, 14-17, 19, 23, 28, 30, and 31 under 35 U.S.C. 103(a) over US 6,399,262 B1 (Oshiba) combined with the other cited references, set forth in the office action mailed on Aug. 10, 2007, paragraphs 12 and 13, have been withdrawn in response to the amendments to claims 1 and 28 filed on Nov. 13, 2007. Amended claims 1 and 28 require that the surface of the intermediate layer have a roughness that satisfies the relationship between the titanyl phthalocyanine average particle diameter and roughness recited in instant claims 1 and 28. For the reasons discussed by applicants filed on Nov. 13, 2007, last paragraph on page 28, Oshida does not disclose an intermediate layer having any surface roughness, let alone a surface roughness that satisfies the relationship recited in instant claims 1 and 28. In addition, newly added claims 32 and 33 require a photoreceptor having an electroconductive substrate having a surface roughness that

satisfies the relationship between the titanyl phthalocyanine average particle diameter and the surface roughness recited in instant claims 32 and 33 and containing “no intermediate layer” between the conductive substrate and the charge generation layer. As discussed in the office action mailed on Aug. 10, 2007, paragraph 12, Oshiba discloses a photoreceptor comprising an electroconductive substrate having a particular Rz surface roughness. However, Oshiba requires that the substrate undergo an anodic oxidation to form an alumite film on the substrate, which is an intermediate layer. The Oshiba alumite film is thus outside the limitation of "no intermediate layer" recited in instant claims 32 and 33.

5. The instant specification at page 12, lines 14-21, discloses that the term “surface roughness” recited in the instant claims “means the ten point mean roughness which can be measured by a method based on JIS B0601. Specifically, the roughness is represented by the difference between the average height of the five projected portions and the average depth of the five recessed portions in a unit length.”

6. Claims 28 and 33 are objected to because of the following informalities:

In claims 28 and 33, the term "the charge generation material" in the phrase "the average particle diameter of the charge generation material is not greater than 0.3 μm . . ." (emphasis added) lacks antecedent basis in said claims. Both claims previously recite a charge generation layer comprising "a titanyl phthalocyanine having an average particle diameter . . . ," not a charge generation material.

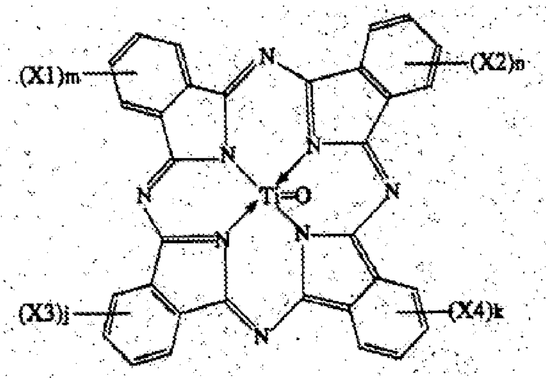
Appropriate correction is required.

7. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

8. Claims 28 and 33 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claims contain subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

(1) Instant claims 28 and 33 recite that the titanyl phthalocyanine having an X-ray diffraction spectrum according to Figure 13 is represented by formula (1)



(1)

where X1, X2, X3 and X4 independently represent a halogen atom, and m, n, j, and k are independently 0 or an integer from 1 to 4.

The originally filed specification does not provide an adequate written description of halogen-substituted titanyl phthalocyanines having an X-ray diffraction spectrum according to Figure 13 represented by formula (1) where one or more of m, n, j, and k are an integer from 1 to 4. In synthesis example 1, the originally filed specification discloses that the resultant non-substituted titanyl phthalocyanine has an X-ray diffraction spectrum as shown in Figure 13. That titanyl phthalocyanine is represented by formula (1) when m, n, j, and k are 0. There is no description in the originally filed specification of halogen-substituted titanyl phthalocyanines represented by formula (1)

having an X-ray diffraction spectrum according to Figure 13 as recited in instant claims 28 and 33. Applicants have not indicated where in the originally filed specification there is an adequate written description of such halogen-substituted titanyl phthalocyanines having an X-ray diffraction spectrum according to Figure 13.

9. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

10. Claims 1, 7, 8, 10-14, 16-20, 22, 23, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 2002/0076633 A1 (Niimi’633), as evidenced by applicants’ admission at page 87, lines 22-23, of the instant specification (applicants’ admission I) and by the ACS File Registry RN 26201-32-1, combined with: (1) US 5,871,875 (Chambers); (2) US 5,776,650 (Hashimoto); and (3) US 6,623,899 B2 (Takaya).

Niimi’633 discloses an electrophotographic photoreceptor comprising an aluminum drum as the electroconductive substrate; an undercoat layer; a charge generation layer; a charge transport layer formed on the charge generation layer using a halogen-free solvent, and a protective layer. The charge generation layer comprises a polyvinyl butyral resin and a

bisazo charge generation material. The charge transport layer is obtained by coating the charge generation layer with a coating solution comprising a binder resin, a charge transport compound, and the solvent tetrahydrofuran. The protective layer comprises a charge transport polymer comprising a triarylamine moiety in a main chain and particulate alumina filler having a specific resistivity of 2.5×10^{12} Ω·m. See refining example 6 at pages 24-25, paragraphs 0346-0351; pages 25-26, paragraphs 0358 to 0367; and example 6 at page 27, paragraphs 0380-0381. The Niimi'633 charge transport layer meets the charge transport layer limitations recited in instant claims 1, 16, and 28. The protective layer in example 6 meets the protective layer limitations recited in instant claims 10-12 and 14.

Niimi'633 does not teach the problems of using chlorinated solvents. However, it is well known in the electrophotographic arts that the use of chlorinated solvents has environmental safety problems. See Chambers, col. 2, lines 14-21. According to Chambers, chlorinated solvents, such as dichloroethane, monochlorobenzene, and methylene chloride, provide charge transport layers having good coating quality. However, Chambers discloses that "chlorinated solvents have environmental safety problems . . . the use of these solvents requires solvent

abatement systems in order to eliminate leakage. Therefore, non-chlorinated solvent systems that provide coating qualities similar to or better than those of chlorinated solvent systems are desired."

Niimi'633 also does not identify its alumina filler as a "α-alumina" as recited in instant claim 13. However, as discussed supra, the Niimi'633 alumina filler has a specific resistivity of 2.5 x 10^{12} Ω·m. The instant specification discloses a "α-alumina" having a specific resistivity of 2.5 x 10^{12} Ω·m. Instant specification, page 87, lines 22-23. Because the Niimi'633 alumina filler has the same specific resistivity as the "α-alumina" disclosed in the instant specification and is used for the same purpose as a filler in a protective layer for a photoreceptor, it is reasonable to presume that the Niimi'633 alumina filler is an "α-alumina" as recited in instant claim 13. The burden is on applicants to prove otherwise. In re Fitzgerald, 205 USPQ 594 (CCPA 1980).

Niimi'633 further discloses that its photoreceptor may be used as the photoreceptor in an image forming apparatus or a process cartridge. The image forming apparatus comprises at least one image forming unit, which comprises a photoreceptor **1**, a charger **8**, a light irradiator "**5** [sic: **10** in Fig. 3]," an image developer **11**, and a transfer device **15**. Page 4,

paragraph 0061; Fig. 3; and page 21, paragraphs 0300-0305. Niimi'633 teaches that the light irradiator is preferably a laser diode or a light emitting diode as recited in instant claim 19, and that the charger is preferably a contact charger or a proximity charger as recited in instant claims 20 and 22. Page 4, paragraph 0062; and page 21, paragraph 0304. Niimi'633 further teaches that the image forming apparatus can comprise a plurality of image forming units. See Fig. 7, and pages 22-23, paragraphs 0321-0324. The Niimi'633 process cartridge comprises a photoreceptor **43**, and at least one of a charger **40**, an image irradiator **41**, or an image developer **45**. Page 5, paragraph 0063; Fig. 5; and page 22, paragraph 0319.

Niimi'633 further teaches that the charge generation material in the charge generation layer can preferably be a titanyl phthalocyanine pigment having an X-ray diffraction spectrum in which a highest peak is observed at Bragg 2θ angle of 27.2° $\pm$ 0.2° when a specific X-ray of Cu-Kα having a wavelength of 1.541 Å irradiates the titanyl phthalocyanine pigment. Paragraph 0151 and example 28 at page 32, paragraph 0476. In example 28, the exemplified charge generation layer comprises a titanyl phthalocyanine pigment having the X-ray diffraction spectrum shown in Fig. 6 and a polyvinyl butyral binder resin. The diffraction spectrum in

Fig. 6 further has a lowest angle peak at 7.4°, peaks at 9.5°, 9.7°, and 23.5°, and no peak at 26.3°. See Fig. 6. The locations of the peaks at 7.4°, 9.5°, 9.7°, and 23.5° were determined by measuring the positions of the peaks with a ruler and correlating the positions with the x-axis in Fig. 6.

Niimi'633 does not explicitly identify the chemical structure of its titanyl phthalocyanine. However, as evidenced by the ACS File Registry RN 26201-32-1, it is well known that titanyl phthalocyanine has a chemical structure that is within the compositional limitations of formula (1) recited in instant claim 28, when the indexes m, n, j, and k are 0.

Nimi'633 also does not disclose that its titanyl phthalocyanine has the X-ray diffraction spectrum according to Figure 13, when a Cu-Kα X-ray having a wavelength of 1.542 Ǻ is used, as recited in instant claims 1 an 28. As discussed <u>supra</u>, the Niimi'633 X-ray diffraction spectrum is obtained using a Cu-Kα X-ray having a wavelength of 1.541 Ǻ, not 1.542 Ǻ, as recited in instant claims 1 and 28. However, the peaks at the Bragg angles in the X-ray diffraction spectrum in Fig. 6 of Niimi'633 are within the scope of the spectrum in Figure 13 recited in instant claims 1 and 28. The Niimi'633 spectrum in Fig. 6 appears to be identical to that shown in Figure 13 of instant claims 1 and 28. The differences, if any, between the

Niimi’633 spectrum in Fig. 6 and the spectrum in Figure 13 recited in instant claims 1 and 28, appear to be artifacts that may be attributed to how the diffraction spectrums were obtained or to data manipulation, e.g., using a smoothing method to remove the noise in the spectrum. Thus, it is reasonable to presume that the Niimi’633 titanyl phthalocyanine has an X-ray diffraction spectrum that meets the X-ray diffraction spectrum in Figure 13, when a Cu-Kα X-ray having a wavelength of 1.542 Å is used, as recited in instant claims 1 and 28. The burden is on applicants to prove otherwise. Fitzgerald, supra.

Niimi’633 does not exemplify a charge generation layer comprising its titanyl phthalocyanine pigment having an average particle diameter as recited in the instant claims. However, as discussed above, Niimi’633 exemplifies a charge generation layer comprising its titanyl phthalocyanine and a polyvinyl butyral binder resin. See example 28 at paragraph 0476. Niimi’633 teaches that the charge generation layer is prepared by mixing the charge generation material with a proper solvent and binder resin and dispersing the mixture with “a ball mill . . . to prepare a coating liquid.” Paragraphs 0154-0157.

Hashimoto teaches a method of preparing a charge generation dispersion liquid for forming a charge generation layer comprising the step of dispersing a charge generation pigment or

dye and a binder resin with a ball-shaped pulverizing media in a dispersing solvent to an average particle size of about 0.1 to 0.3 µm. Col. 2, lines 52-68. Hashimoto exemplifies forming charge generation layers with said charge generation dispersion liquid where the average particle size of the organic pigment or dye dispersoids is either 0.15 µm or 0.18 µm. See the 1st and 2nd embodiments at col. 6, line 33-64, and col. 7, lines 26-30, respectively, and in Table 1 at col. 8. The average particle sizes of about 0.1 to 0.3 µm, e.g., 0.15 µm or 0.18 µm, are within the particle diameter limitation of "not greater than 0.3 µm" recited in instant claims 1 and 28. Hashimoto teaches that the charge generation pigments or dyes "are not specifically limited as far as the pigments or the dyes may function as a charge generating agent in a charge generation layer. For example, pigments such as phthalocyanine pigments . . ." Col. 4, lines 45-50. According to Hashimoto, when the organic pigment or dye is dispersed in a resin binder as taught by Hashimoto to an average particle size of about 0.1 to 0.3 µm, the "pigment or dye dispersoids are prevented from coagulating for a time period long enough to cause no problems in practical use of the dispersion liquid." Col. 4, lines 20-28. Hashimoto teaches that its dispersion liquid "exhibits excellent stability of the pigment or dye dispersoids, facilitates manufacturing

electro-photographic photoconductors having a charge generation layer which exhibits excellent photographic properties.” Col. 4, lines 29-33. The photoconductor also has improved stability. Col. 2, lines 41-43.

It would have been obvious for a person having ordinary skill in the art, in view of the teachings of Niimi’633 and Hashimoto, to prepare a charge generation dispersion coating solution comprising the Niimi’633 titanyl phthalocyanine pigment and polyvinylbutyral resin, as taught by Hashimoto, such that the resultant dispersion solution comprises titanyl phthalocyanine pigment dispersoids having an average particle size of about 0.1 to 0.3 µm, e.g., 0.15 µm or 0.18 µm. It would have also been obvious for that person, in view of the teachings of Chambers, to use the resultant dispersion solution to form the charge generation layer in the Niimi’633 photoreceptor in example 1 that comprises the charge transport layer formed using tetrahydrofuran. That person would have had a reasonable expectation of successfully obtaining an electrophotographic photoreceptor, an image forming apparatus, and a process cartridge without the use of environmentally problematic chlorinated solvents, all of which have improved stability and excellent photoconductive properties as taught by Hashimoto.

Instant claim 7 is written in product-by-process format. The combined teachings of Niimi'633 and Hashimoto do not disclose that the charge generation layer is formed by the method recited in the instant claim 7. However, as discussed above, the combined teachings of Niimi'633 and Hashimoto render obvious a titanyl phthalocyanine pigment having an average particle size of about 0.1 to 0.3 μm, e.g., 0.15 μm or 0.18 μm. The average particle sizes of 0.15 or 0.18 μm meet the average particle size limitation of "not greater than 0.3 μm" recited in instant claim 7. Because the average particle size of 0.15 or 0.18 μm is much smaller than the average particle size limitation of not greater than 0.3 μm recited in instant claim 7, it is reasonable to conclude that the average particle size of 0.15 or 0.18 μm meets the particle size standard deviation of "not greater than 0.2 μm" recited in instant claim 7. Thus, it appears that the charge generation layer rendered obvious over the combined teachings of Niimi'633 and Hashimoto is the same or substantially the same as the instantly recited charge generation layer made by the process recited in instant claim 7. The burden is on applicants to prove otherwise. In re Marosi, 218 USPQ 289 (Fed. Cir. 1983); In re Thorpe, 227 USPQ 964 (Fed. Cir. 1985); MPEP 2113.

Instant claim 8 is written in product-by-process format. Niimi'633 does not disclose that its titanyl phthalocyanine material is obtained by the method recited in instant claim 8. However, the Niimi'633 titanyl phthalocyanine pigment exhibits an X-ray diffraction spectrum that meets the spectrum in Figure 13 recited in instant claims 1 and 28. The titanyl phthalocyanine pigment average particle size of 0.15 µm or 0.18 µm rendered obvious over the combined teachings of Niimi'633 and Hashimoto meets the particle size limitation of "not greater than 0.3 µm" recited in instant claims 1 and 28. Therefore, it appears that the titanyl phthalocyanine pigment rendered obvious over the combined teachings of Niimi'633 and Hashimoto is the same or substantially the same as the instantly recited titanyl phthalocyanine crystal made by the process steps recited in the instant claim. The burden is on applicants to prove otherwise. Marosi; Thorpe; MPEP 2113.

Niimi'633 also does not exemplify a photoreceptor comprising an undercoat layer having the surface roughness as recited in the instant claims. However, Niimi'633 does not limit the type of undercoat layer used. Page 12, paragraph 0180; and reference claim 22.

Takaya teaches the use of a particular intermediate layer located between the charge generation layer and the

electroconductive substrate of an electrophotographic photosensitive member. Takaya discloses that the intermediate layer has a layer thickness of at least 0.5 µm and comprises aggregated particles of $Al_2O_3 \cdot nH_20$, where n is a number of at least 0 representing "a degree of hydration." Col. 3, lines 55-63. Takaya teaches that the intermediate layer preferably has a 10-point surface roughness Rz (according to JIS B06010) of "0.1 to 1 µm so as to provide improved function of preventing the occurrence of interference fringes sometimes encountered in an electrophotographic apparatus of a digital scheme using coherent light such as laser light as exposure light." Col. 7, lines 1-8. Takaya exemplifies an intermediate layer having a 10-point surface roughness Rz of 0.5 µm. See, for example, example 1, col. 10, lines 13-27. Takaya discloses that its intermediate layer "can be formed in a crack-free state inexpensively and without requiring a special technique by using a coating liquid of a good storage stability." Col. 3, lines 34-37. According to Takaya, prior art intermediate layers comprising a polyamide resin are "liable to have an electrical resistance which is liable to change depending on environmental changes, so that it has been difficult to provide an electrophotographic photosensitive member having stable and excellent potential characteristics in all environments ranging

from low temperature/low humidity to high temperature/high humidity." Col. 2, lines 14-27. Takaya discloses that photosensitive members comprising its particular intermediate layer solve the above-mentioned problems of the prior art. Col. 3, lines 27-30. Takaya discloses that such photosensitive members exhibit "excellent potential characteristic and image forming characteristic free from difficulties, such as lower image density or black spots and fog, over a variety of temperature and humidity environment conditions even at a smaller thickness of photosensitive layer." Col. 3, lines 39-46; example 1, col. 11, lines 12-19; and Table 1 at col. 13, example 1.

When the Takaya intermediate layer is used in the photoreceptor rendered obvious over the combined teachings of Niimi'633 and Hashimoto, the resultant photoreceptor satisfies the surface roughness - particle size relationships recited in instant claims 1 and 28. As discussed supra, the titanyl phthalocyanine pigment particles in the charge generation layer rendered obvious over the combined teachings of Niimi'633 and Hashimoto have an average particle size of 0.15 or 0.18 μm. The average particle sizes of 0.15 and 0.18 μm are smaller than the Takaya undercoat layer 10-point surface roughness of 0.5 μm and

are also not greater than 2/3 of the roughness of 0.5 µm (i.e., 0.33 µm), as recited in instant claims 1 and 28.

It would have been obvious for a person having ordinary skill in the art, in view of the teachings in Takaya, to use the undercoat layer taught by Takaya having a 10-point surface roughness Rz of 0.5 µm as the undercoat layer in the photoreceptor rendered obvious over the combined teachings of Niimi'633, Chambers, and Hashimoto, and to use the resultant photoreceptor in the image forming apparatus and process cartridge rendered obvious over the combined teachings of Niimi'633, Chambers, and Hashimoto. That person would have had a reasonable expectation of successfully obtaining an electrophotographic photoreceptor, an image forming apparatus, and a process cartridge that prevent the occurrence of interference fringes and exhibit excellent potential characteristics and image forming characteristics free from difficulties over a variety of temperature and humidity environment conditions as disclosed by Takaya.

11. Claims 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Niimi'633, as evidenced by applicants' admission I and by the ACS File Registry RN 26201-32-1, combined with: (1) Chambers; (2) Hashimoto; and (2) Takaya, as applied to

claim 20 above, further combined with US 2002/0051654 A1 (Niimi'654).

The claims are rejected for the reasons discussed in the office action mailed on Oct. 30, 2006, paragraph 11, which are incorporated herein by reference.

12. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Niimi'633, as evidenced by applicants' admission I and by the ACS File Registry RN 26201-32-1, combined with: (1) Chambers; (2) Hashimoto; and (2) Takaya, as applied to claim 1 above, further combined with US 4,806,443 (Yanus).

Niimi'633, as evidenced by applicants' admission I and the ACS File Registry RN 26201-32-1, combined with the teachings of: (1) Chambers; (2) Hashimoto; and (3) Takaya renders obvious an electrophotographic photoreceptor as described in paragraph 10 above, which is incorporated herein by reference.

Niimi'633 does not exemplify a charge transport layer formed from a non-halogen solvent comprising a polycarbonate resin having a triarylamine structure as recited in instant claim 9.

Yanus teaches a charge transport layer comprising a polycarbonate resin comprising triarylamine moieties in the main chain of the resin, which meets the charge transport layer

compositional limitations recited in instant claim 9. See polycarbonate resins at col. 9, lines 5-40, and in example III at cols. 19-20. Yanus exemplifies forming a charge transport layer coating solution by dissolving the polycarbonate resin in tetrahydrofuran (THF) or cyclohexanone, and coating said charge transport layer coating solution on a photoconductive layer (also known in the electrophotographic arts as a charge generation layer). See examples IV and V at col. 20. THF and cyclohexanone are both non-halogen solvents, which avoid the environmental safety problems disclosed by Chambers. Yanus further teaches that an overcoat layer can be formed over the charge transport layer to improve resistance to abrasion. Col. 18, lines 29-30. According to Yanus, when its charge transport layer is formed on a photoconductive layer, the charge transport layer not only serves to transport the photogenerated holes, but "also protects the photoconductive layer from abrasion or chemical attack and therefore extends the operating life of the electrophotographic imaging member." Col. 17, lines 9-20.

It would have been obvious for a person having ordinary skill in the art, in view of the teachings of Yanus, to make and use the charge transport layer disclosed by Yanus as the charge transport layer in the photoreceptor rendered obvious over the

combined teachings of Niimi'633, Chambers, Hashimoto, and Takaya. That person would have had a reasonable expectation of successfully obtaining an electrophotographic photoreceptor having the advantages disclosed by Yanus.

13. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Niimi'633, as evidenced by applicants' admission I and by the ACS File Registry RN 26201-32-1, combined with: (1) Chambers; (2) Hashimoto; and (2) Takaya, as applied to claim 1 above, further combined with US 6,080,491 (Takaki).

Niimi'633, as evidenced by applicants' admission I and the ACS File Registry RN 26201-32-1, combined with the teachings of: (1) Chambers; (2) Hashimoto; and (3) Takaya renders obvious an electrophotographic photoreceptor as described in paragraph 10 above, which is incorporated herein by reference.

Niimi'633 does not exemplify an aluminum drum that is subjected to an anodic oxidation treatment as recited in instant claim 15.

However, the subjection of an aluminum drum to an anodic oxidation treatment is well known in the electrophotographic arts. Takaki teaches an aluminum drum that is subjected to an anodic oxidation treatment to form an anodic oxide layer and then sealing the layer first with nickel fluoride and then with

nickel acetate. See embodiment 1 at col. 6, lines 34-57. Takaki teaches that said anodized aluminum drum can be used as the electroconductive substrate in a photoconductor (also known in the electrophotographic arts as a photoreceptor). Takaki further teaches that the anodized aluminum drum can be coated with an undercoating layer, which in turn can be coated with a charge generation layer and a charge transport layer. Col. 5, lines 18-23, and Fig. 2. According to Takaki, when its anodized aluminum drum is used as the conductive substrate in a photoconductor, the resultant photoconductor exhibits a small change in charge potential between the first and second rotations of the photoconductor, initially and after forming 100,000 copies. The photoconductor also provides good images after forming 100,000 copies. Col. 2, lines 53-59, and Table 2 at cols. 7 and 8, for example, embodiment 1.

It would have been obvious for a person having ordinary skill in the art, in view of the teachings of Takaki, to use the anodized and sealed aluminum drum disclosed by Takaki as the electroconductive substrate in the photoreceptor rendered obvious over the combined teachings of Niimi’633, Chambers, Hashimoto, and Takaya. That person would have had a reasonable expectation of successfully obtaining an electrophotographic photoreceptor having the advantages disclosed by Takaki.

14. Claims 1, 7, 8, 10-14, 16-23, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over European Patent 1,205,808 A1 (Tamoto), as evidenced by the ACS File Registry RN 26201-32-1, combined with Hashimoto and Takaya.

Tamoto discloses electrophotographic photoreceptors comprising an electroconductive substrate; an undercoat layer; a charge generation layer; a charge transport layer formed on the charge generation layer using a halogen-free solvent, and a protective layer. See paragraphs 0361 and 0418, and examples 32 and 35 in paragraphs 0424 and 0430, respectively.

The charge generation layer comprises a titanyl phthalocyanine having the X-ray diffraction spectrum in Fig. 10 and a polyvinyl butyral resin. The layer has a thickness of 0.2 μm. The X-ray diffraction spectrum in Fig. 10 has a maximum peak at a Bragg angle of 27.2°, a lowest angle peak at 7.3°, peaks at 9.5°, 9.7°, and 23.5°, and no peak at 26.3°. See Fig. 10. The locations of the peaks at angles 7.3°, 9.5°, 9.7°, 23.5°, and 27.2° were determined by measuring the positions of the peaks with a ruler and correlating the positions with the x-axis in Fig. 10.

Tamoto does not explicitly identify the chemical structure of its titanyl phthalocyanine. However, as evidenced by the ACS File Registry RN 26201-32-1, it is well known that titanyl

phthalocyanine has a chemical structure that is within the compositional limitations of formula (1) recited in instant claim 28, when the indexes m, n, j, and k are 0.

Tamoto does not disclose that its titanyl phthalocyanine has the X-ray diffraction spectrum according to Figure 13, when a Cu-Kα X-ray having a wavelength of 1.542 Ǻ is used, as recited in instant claims 1 an 28. However, the peaks at the Bragg angles in the X-ray diffraction spectrum in Fig. 10 of Tamoto are within the scope of the spectrum in Figure 13 recited in instant claims 1 and 28. The Tamoto spectrum in Fig. 10 appears to be identical to that shown in Figure 13 of instant claims 1 and 28. The differences, if any, between the Tamoto spectrum in Fig. 10 and the spectrum in Figure 13 recited in instant claims 1 and 28, appear to be artifacts that may be attributed to how the diffraction spectrums were obtained or to data manipulation, e.g., using a smoothing method to remove the noise in the spectrum. Thus, it is reasonable to presume that the Tamoto titanyl phthalocyanine has an X-ray diffraction spectrum that meets the X-ray diffraction spectrum in Figure 13, when a Cu-Kα X-ray having a wavelength of 1.542 Ǻ is used, as recited in instant claims 1 and 28. The burden is on applicants to prove otherwise. Fitzgerald, supra.

The charge transport layer is obtained by coating the charge generation layer with a coating solution comprising a polycarbonate binder resin, a charge transport compound, and the solvent toluene. In example 32, the protective layer comprises a binder resin, a charge transport compound, and an α-alumina filler having a resistivity of not less than 10^{10} Ω·m. In example 35, the protective layer comprises a charge transport polymer comprising a triarylamine moiety in a side chain (formula 14) and an α-alumina filler. The Tamoto charge transport layer meets the charge transport layer limitations recited in instant claims 1, 16, and 28. The protective layers in examples 32 and 35 meet the protective layer limitations recited in instant claims 10-13 and claims 10 and 14, respectively.

Tamoto further discloses that its photoreceptor may be used as the photoreceptor in an image forming apparatus or a process cartridge. The image forming apparatus comprises at least one image forming unit, which comprises a photoreceptor **1**, a charger **3**, a light irradiator **5**, an image developer **6**, and a transfer device **10**. Paragraphs 0240-0242 and Fig. 6. Tamoto teaches that the light irradiator can be a laser diode or a light emitting diode as recited in instant claim 19. Paragraph 0254. According to Tamoto, the charger can be a

contact charger or preferably a proximity charger as recited in instant claims 20-22. Paragraphs 0246 and 0248-0249. Tamoto further teaches that the image forming apparatus can comprise a plurality of image forming units. See Fig. 7 and paragraphs 0266-0267. The Tamoto process cartridge comprises a photoreceptor **16**, a charger **17**, an image irradiator **19**, and an image developer **20**. Fig. 9 and paragraph 0277.

Tamoto does not exemplify a charge generation layer coating solution comprising its titanyl phthalocyanine pigment having an average particle diameter as recited in the instant claims. However, as discussed supra, Tamoto exemplifies a charge generation layer comprising its titanyl phthalocyanine and polyvinyl butyral resin. See paragraph 0418. Tamoto teaches that the charge generation layer is prepared by mixing the charge generation material with a proper solvent and binder resin and dispersing the mixture with "a ball mill . . . to prepare a coating liquid." Paragraphs 0103.

Hashimoto teaches a method of preparing a charge generation dispersion liquid for forming a charge generation layer comprising the step of dispersing a charge generation pigment or dye with a binder resin with a ball-shaped pulverizing media in a dispersing solvent to an average particle size of about 0.1 to 0.3 μm, e.g., 0.15 or 0.18 μm. The average particle sizes of

about 0.1 to 0.3 μm, e.g., 0.15 or 0.18 μm, are within the particle diameter limitation of "not greater than 0.3 μm" recited in instant claims 1 and 28. The discussion of Hashimoto in paragraph 10 above is incorporated herein by reference.

It would have been obvious for a person having ordinary skill in the art, in view of the teachings of Tamoto and Hashimoto, to prepare a charge generation dispersion coating solution comprising the Tamoto titanyl phthalocyanine pigment and its polyvinylbutyral binder resin, as taught by Hashimoto, such that the resultant dispersion solution comprises titanyl phthalocyanine pigment dispersoids having an average particle size of about 0.1 to 0.3 μm, e.g., 0.15 or 0.18 μm, and to use the resultant dispersion solution to form the charge generation layer in the photoreceptors in examples 32 and 35 of Tamoto. That person would have had a reasonable expectation of successfully obtaining an electrophotographic photoreceptor, an image forming apparatus, and a process cartridge that have improved stability and excellent photoconductive properties as taught by Hashimoto.

Instant claim 7 is written in product-by-process format. The combined teachings of Tamoto and Hashimoto do not disclose that the charge generation layer is formed by the method recited in the instant claim 7. However, as discussed above, the

combined teachings of Tamoto and Hashimoto render obvious a titanyl phthalocyanine pigment having an average particle size of about 0.1 to 0.3 μm, e.g., 0.15 μm or 0.18 μm. The average particle sizes of 0.15 or 0.18 μm meet the average particle size limitation of "not greater than 0.3 μm" recited in instant claim 7. Because the average particle size of 0.15 or 0.18 μm is much smaller than the average particle size limitation of not greater than 0.3 μm recited in instant claim 7, it is reasonable to conclude that the average particle size of 0.15 or 0.18 μm meets the particle size standard deviation of "not greater than 0.2 μm" recited in instant claim 7. Thus, it appears that the charge generation layer rendered obvious over the combined teachings of Tamoto and Hashimoto is the same or substantially the same as the instantly recited charge generation layer made by the process recited in instant claim 7. The burden is on applicants to prove otherwise. In re Marosi, 218 USPQ 289 (Fed. Cir. 1983); In re Thorpe, 227 USPQ 964 (Fed. Cir. 1985); MPEP 2113.

Instant claim 8 is written in product-by-process format. Tamoto does not disclose that its titanyl phthalocyanine material is obtained by the method recited in instant claim 8. However, the Tamoto titanyl phthalocyanine pigment exhibits an

X-ray diffraction spectrum that meets the spectrum in Figure 13 recited in instant claims 1 and 28. The titanyl phthalocyanine pigment average particle size of 0.15 µm or 0.18 µm rendered obvious over the combined teachings of Tamoto and Hashimoto meets the particle size limitation of "not greater than 0.3 µm" recited in instant claims 1 and 28. Therefore, it appears that the titanyl phthalocyanine pigment rendered obvious over the combined teachings of Tamoto and Hashimoto is the same or substantially the same as the instantly recited titanyl phthalocyanine crystal made by the process steps recited in the instant claim. The burden is on applicants to prove otherwise. Marosi; Thorpe; MPEP 2113.

Tamoto also does not exemplify a photoreceptor comprising an undercoat layer having the surface roughness as recited in the instant claims. However, Tamoto does not limit the type of undercoat layer used. Paragraph 0194.

Takaya teaches the benefits of using of a particular intermediate layer located between the charge generation layer and the electroconductive substrate of an electrophotographic photosensitive member, which has a 10-point surface roughness Rz of 0.5 µm. The discussion of Takaya in paragraph 10 above is incorporated herein by reference.

When the Takaya intermediate layer is used in the photoreceptor rendered obvious over the combined teachings of Tamoto and Hashimoto, the resultant photoreceptor satisfies the surface roughness - particle size relationships recited in instant claims 1 and 28. As discussed supra, the titanyl phthalocyanine pigment particles in the charge generation layer rendered obvious over the combined teachings of Tamoto and Hashimoto have an average particle size of 0.15 or 0.18 µm. The average particle sizes of 0.15 and 0.18 µm are smaller than the Takaya undercoat layer 10-point surface roughness of 0.5 µm and are also not greater than 2/3 of the roughness of 0.5 µm (i.e., 0.33 µm), as recited in instant claims 1 and 28.

It would have been obvious for a person having ordinary skill in the art, in view of the teachings in Takaya, to use the undercoat layer taught by Takaya having a 10-point surface roughness Rz of 0.5 µm as the undercoat layer in the photoreceptors rendered obvious over the combined teachings of Tamoto and Hashimoto, and to use the resultant photoreceptor in the image forming apparatus and process cartridge rendered obvious over the combined teachings of Tamoto and Hashimoto. That person would have had a reasonable expectation of successfully obtaining an electrophotographic photoreceptor, an image forming apparatus, and a process cartridge that prevent

the occurrence of interference fringes and exhibit excellent potential characteristics and image forming characteristics free from difficulties over a variety of temperature and humidity environment conditions as disclosed by Takaya.

15. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tamoto, as evidenced by the ACS File Registry RN 26201-32-1, combined with Hashimoto and Takaya, as applied to claim 1 above, further combined with Yanus.

Tamoto, as evidenced by the ACS File Registry RN 26201-32-1, combined with the teachings of Hashimoto and Takaya renders obvious an electrophotographic photoreceptor as described in paragraph 14 above, which is incorporated herein by reference.

Tamoto does not exemplify a charge transport layer formed from a non-halogen solvent comprising a polycarbonate resin having a triarylamine structure as recited in instant claim 9.

Yanus teaches a charge transport layer comprising a polycarbonate resin comprising triarylamine moieties in the main chain of the resin, which meets the charge transport layer compositional limitations recited in instant claim 9. Yanus exemplifies forming a charge transport layer coating solution by dissolving the polycarbonate resin in tetrahydrofuran (THF) or

cyclohexanone, and coating said charge transport layer coating solution on a photoconductive layer (also known in the electrophotographic arts as a charge generation layer). The discussion of Yanus in paragraph 12 above is incorporated herein by reference.

It would have been obvious for a person having ordinary skill in the art, in view of the teachings of Yanus, to make and use the charge transport layer disclosed by Yanus as the charge transport layer in the photoreceptor rendered obvious over the combined teachings of Tamoto, Hashimoto, and Takaya. That person would have had a reasonable expectation of successfully obtaining an electrophotographic photoreceptor having the advantages disclosed by Yanus.

16. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tamoto, as evidenced by the ACS File Registry RN 26201-32-1, combined with Hashimoto and Takaya, as applied to claim 1 above, further combined with Takaki.

Tamoto, as evidenced by the ACS File Registry RN 26201-32-1, combined with the teachings of Hashimoto and Takaya renders obvious an electrophotographic photoreceptor as described in paragraph 14 above, which is incorporated herein by reference.

Tamoto does not exemplify an aluminum drum that is subjected to an anodic oxidation treatment as recited in instant claim 15.

However, the subjection of an aluminum drum to an anodic oxidation treatment is well known in the electrophotographic arts. Takaki teaches an aluminum drum that is subjected to an anodic oxidation treatment to form an anodic oxide layer and then sealing the layer first with nickel fluoride and then with nickel acetate. The discussion of Takaki in paragraph 13 above is incorporated herein by reference.

It would have been obvious for a person having ordinary skill in the art, in view of the teachings of Takaki, to use the anodized and sealed aluminum drum disclosed by Takaki as the electroconductive substrate in the photoreceptor rendered obvious over the combined teachings of Tamoto, Hashimoto, and Takaya. That person would have had a reasonable expectation of successfully obtaining an electrophotographic photoreceptor having the advantages disclosed by Takaki.

17. Claims 32 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 2002/0064721 A1 (Ishii) combined with: (1) Chambers; (2) US 5,496,671 (Tamura); (3) Japanese Patent 2000-319538 (JP’538), as evidenced by Ladd et al.,

Structure Determination by X-ray Diffraction, p. 426 (Ladd), and applicants' admission in synthesis example 1 of the instant specification (applicants' admission II); and (4) Hashimoto. See the USPTO English-language translation of JP'538 for cites.

Ishii discloses an electrophotographic photoconductor (also known in the electrophotographic arts as a photoreceptor) comprising a particular aluminum drum, as the electroconductive substrate, an intermediate layer, a charge generation layer, and a charge transport layer. The aluminum cylinder has a 10-point average surface roughness Rz (according to JIS B0601—1994) of 1.3 μm. See paragraph 0035 and example 1 in paragraphs 0101 to 0107. Although example 1 in Ishii comprises an intermediate layer, Ishii teaches that said layer is optional. See paragraph 0077. In other words, Ishii teaches photoconductors not containing an intermediate layer that meet the "no intermediate layer" limitation recited in instant claims 32 and 33.

In example 1 of Ishii, the charge transport layer is obtained by coating the charge generation layer with a coating solution comprising a binder resin, a charge transport compound, and the solvent mixture of monochlorobenzene and dichlorethane. Ishii does not exemplify forming a charge transport layer with a non-halogen solvent as recited in instant claims 32 and 33.

However, Ishii does not limit the type of charge transport layer used. Paragraphs 0068 and 0069.

It is well known in the electrophotographic arts that the use of chlorinated solvents has environmental safety problems. See Chambers, col. 2, lines 14-21. According to Chambers, chlorinated solvents, such as dichloromethane, dichloroethane, monochlorobenzene, and methylene chloride, provide charge transport layers having good coating quality. However, Chambers discloses that "chlorinated solvents have environmental safety problems . . . the use of these solvents requires solvent abatement systems in order to eliminate leakage. Therefore, non-chlorinated solvent systems that provide coating qualities similar to or better than those of chlorinated solvent systems are desired."

Tamura teaches a charge transport layer comprising a charge transport polymer comprising a triarylamine moiety in the side chain of the polymer. The charge transport layer is formed by coating the charge generation layer with a solution comprising the carbon-carbon double bond containing triarylamine compound CTM-3, a carbon-carbon double bond-containing monomer, and toluene, and photo-setting the coating to form the charge transport polymeric layer. CTM-3 at col. 7; synthesis example 1 at col. 42; and example 1 at col. 43, lines 15-26. Toluene is a

non-chlorinated solvent, which avoids the environmental safety problems disclosed by Chambers. The Tamura charge transport layer meets the charge transport layer limitations recited in instant claim 32 and 33. According to Tamura, an electrophotographic photoconductor comprising its charge transport layer has improved mechanical strength and high photosensitivity and durability. Col. 1, lines 57-60.

It would have been obvious for a person having ordinary skill in the art, in view of the teachings in Ishii, Chambers, and Tamura, to remove the optional intermediate in the photoconductor in example 1 of Ishii and to use the charge transport layer taught by Tamura as the charge transport layer in that photoconductor. That person would have had a reasonable expectation of successfully obtaining an electrophotographic photoconductor that has the properties disclosed by Ishii in paragraph 0011 and that has improved mechanical strength and high photosensitivity and durability as taught by Tamura without the use of environmentally problematic chlorinated solvents as taught by Chambers.

In example 1, the charge generation layer comprises 3 parts of a polyvinyl butyral resin and 6.6 parts by weight of a hydroxygallium phthalocyanine as the charge generation material. Ishii requires that the charge generation material be present in

an amount of more than 2 parts by weight and not more than 5 parts by weight based on 1 part by weight of binder resin. Paragraph 0012.

Ishii does not exemplify a titanyl phthalocyanine having an X-ray diffraction spectrum according to Figure 13 as recited in instant claims 32 and 33. However, Ishii teaches that the charge generation material can equally be an oxytitanium phthalocyanine (also known as a titanyl phthalocyanine) having the chemical structure of formula (6) disclosed in paragraph 0043. Also see paragraph 0038, lines 7-8. The chemical structure of formula (6) meets the compositional limitations of formula (1) recited in instant claim 33.

JP'538 teaches a titanyl phthalocyanine pigment that meets the compositional limitations of the chemical formula recited in instant claim 33 as well as formula (6) of Ishii. Translation, paragraph 0008. The titanyl phthalocyanine pigment has an X-ray diffraction spectrum in which a highest peak is observed at Bragg 2θ angle of $27.2^\circ \pm 0.2^\circ$ and a lowest peak at an angle of 7.3°, when a specific X-ray of Cu-Kα having a wavelength of 1.514 Å irradiates the titanyl phthalocyanine pigment. Translation, paragraph 0012, and synthesis example 1 in paragraphs 0047-0052 and in Table 1, and Fig. 5. JP'538 teaches that there are no peaks between Bragg angles 7.4° and 9.4°.

Translation, paragraph 0012. The diffraction spectrum further has peaks at 9.5°, 9.7°, and 23.5°, and no peak at 26.3°. See Fig. 5. The locations of the peaks at angles 9.5°, 9.7°, and 23.5° were determined by measuring the positions of the peaks with a ruler and correlating the positions with the x-axis in Fig. 5. JP'538 further discloses forming a charge generating coating solution by dispersing 10 parts by weight of a particular polyvinyl butyral binder resin and 15 parts by weight of its titanyl phthalocyanine in the solvent methyl ethyl ketone using a ball mill. Translation, paragraph 0058, example 1. JP'538 teaches that the amount of the binder resin can preferably be 10 to 300 parts by weight per 100 parts by weight of its titanyl phthalocyanine. Translation, paragraph 0031. According to JP'538, when its titanyl phthalocyanine pigment is used as the charge generation material in the charge generation layer in a photoreceptor, the resulting photoreceptor has high photosensitivity even after repeated use. The chargeability of the photoreceptor does not decrease and the residual potential does not increase after repeated use. Translation, paragraphs 0006 and 0070.

The JP'538 reported wavelength of 1.514 Ǻ appears to be a typographic error. The Cu-Kα wavelength of 1.514 Ǻ does not appear to exist. It is well known that the Cu-Kα spectra line

is a doublet consisting of α1 (λ = 1.5405) and α2 (λ = 1.5443). The weighted mean Kα line is 1.542 Å, which is the value normally used in Cu-Kα X-ray diffraction. See Ladd, p. 426. Accordingly, because JP'538 teaches using the X-ray of Cu-Kα and that Cu-Kα is known in the art to have mean wavelength of 1.542 Å, it is reasonable to presume that the X-ray diffraction spectrum disclosed in JP'538 is determined with Cu-Kα having a wavelength of 1.542 Å, as recited in the instant claims. The burden is on applicants to prove otherwise. Fitzgerald, supra.

JP'538 does not disclose that its titanyl phthalocyanine has the X-ray diffraction spectrum according to Figure 13 as recited in instant claims 32 and 33. However, the peaks at the Bragg angles in the X-ray diffraction spectrum in Fig. 5 of JP'538 are within the scope of the spectrum in Figure 13 recited in instant claims 32 and 33. The JP'538 spectrum in Fig. 5 appears to be identical to that shown in Figure 13 of instant claims 32 and 33. The differences, if any, between the JP'538 spectrum in Fig. 5 and the spectrum in Figure 13 recited in instant claims 32 and 33, appear to be artifacts that may be attributed to how the diffraction spectrums were obtained or to data manipulation, e.g., using a smoothing method to remove the noise in the spectrum. The JP'538 titanyl phthalocyanine crystal in the synthesis example 1 is also obtained by process

steps that appear to be the same or substantially the same as those used in synthesis example 1 of the instant specification, wherein the resultant titanyl phthalocyanine has an X-ray diffraction spectrum according to Figure 13. Thus, it is reasonable to presume that the JP'538 titanyl phthalocyanine has an X-ray diffraction spectrum that meets the X-ray diffraction spectrum in Figure 13, when a Cu-Kα X-ray having a wavelength of 1.542 Å is used, as recited in instant claims 32 and 33 The burden is on applicants to prove otherwise. Fitzgerald, supra.

JP'538 does not exemplify a charge generation layer coating solution comprising its titanyl phthalocyanine pigment having an average particle diameter as recited in the instant claims. However, as discussed supra, JP'538 exemplifies a charge generation layer coating solution obtained by dispersing a particular polyvinyl butyral binder resin and its titanyl phthalocyanine in a solvent using a ball mill.

Hashimoto teaches a method of preparing a charge generation dispersion liquid for forming a charge generation layer comprising the step of dispersing a charge generation pigment or dye with a binder resin with a ball-shaped pulverizing media in a dispersing solvent to an average particle size of about 0.1 to 0.3 µm, e.g., 0.15 or 0.18 µm. The average particle sizes of about 0.1 to 0.3 µm, e.g., 0.15 or 0.18 µm, are within the

particle diameter limitation of "not greater than 0.3 µm" recited in instant claims 32 and 33. The discussion of Hashimoto in paragraph 10 above is incorporated herein by reference.

When a charge generation dispersion coating solution comprising the JP'538 titanyl phthalocyanine pigment and its particular polyvinylbutyral resin in the amounts taught by Ishii, is prepared as taught by Hashimoto, such that the resultant dispersion solution comprises titanyl phthalocyanine pigment dispersoids having an average particle size of about 0.1 to 0.3 µm, e.g., 0.15 or 0.18 µm, and is then used to form the charge generation in the photoconductor rendered obvious over the combined teachings of Ishii, Chambers, and Tamura, the resultant photoconductor satisfies the surface roughness - particle size relationships recited in instant claims 32 and 33. The average particle sizes of 0.15 and 0.18 µm are smaller than the Ishii aluminum cylinder surface roughness Rz of 1.3 µm and are also not greater than 2/3 of the roughness of 1.3 µm (i.e., 0.87 µm), as recited in instant claims 32 and 33.

It would have also been obvious for a person having ordinary skill in the art, in view of the teachings of Ishii, JP'538, and Hashimoto, to prepare a charge generation dispersion coating solution comprising the JP'538 titanyl phthalocyanine

pigment and its particular polyvinylbutyral resin in the amounts taught by Ishii, as taught by Hashimoto, such that the resultant dispersion solution comprises titanyl phthalocyanine pigment dispersoids having an average particle size of about 0.1 to 0.3 µm, e.g., 0.15 or 0.18 µm, and to use the resultant dispersion solution to form the charge generation layer in the photoconductor rendered obvious over the combined teachings of Ishii, Chambers, and Tamura. That person would have had a reasonable expectation of successfully obtaining an electrophotographic photoconductor that has high photosensitivity and stable charging properties and residual potential properties after repeated use, as taught by JP'538, and that has further improved stability and excellent photoconductive properties as taught by Hashimoto.

18. Applicants' arguments filed on Nov. 13, 2007, as applicable to the rejections set forth in paragraphs 10-17 above, have been fully considered but they are not persuasive.

Applicants assert that none of the cited references in the rejections set forth in paragraphs 10-16 discloses or suggests the photoreceptor as recited in instant claims 1 and 28. Applicants further assert that none of references discloses or suggests the advantages sought by applicants.

Applicants' assertions are not persuasive. For the reasons discussed in paragraphs 10 and 14, the combined teachings of the cited references renders obvious electrophotographic photoreceptors that meet all of the compositional limitations, particle size, and surface roughness limitations recited in instant claims 1 and 28. In addition, the reasons for combining the references do not have to be those of applicants.

As discussed in paragraph 10 above, the photoreceptor exemplified in example 6 of Niimi'633 comprises a charge transport layer made with the halogen-free solvent tetrahydrofuran. Niimi'633 teaches that the charge generation material used in its charge generation layer can be a titanyl phthalocyanine. Niimi'633 also exemplifies such a charge generation layer (CGL) in example 28. As discussed in paragraph 10 above and admitted by applicants in the response filed on Jul. 12, 2007, page 24, lines 4-5, it is well known that the use of chlorinated solvents, which are halogenated solvents, have environmental safety problems. Thus, for the reasons discussed in paragraph 10 above, it would have been obvious for a person having ordinary skill in the art to use the CGL in example 28 of Niimi'633 as the CGL in the photoreceptor exemplified in example 6 of Niimi'633.

As discussed in paragraph 14 above, Tamoto teaches photoreceptors comprising a CTL formed with the solvent toluene, which is a non-halogenated solvent, and a charge generation layer comprising a titanyl phthalocyanine.

For the reasons discussed in the rejections in paragraphs 10 and 14 above, Hashimoto provides reason, suggestion, and motivation to make and use a charge generation layer coating solution comprising the titanyl phthalocyanine pigment taught by Niimi'633 or Tamoto, as taught by Hashimoto, such that the resultant pigment dispersoids have an average particle size of about 0.1 to 0.3 μm, such as 0.15 or 0.18 μm. Takaya provides reason, suggestion, and motivation to use its intermediate layer as the intermediate layer in the photoreceptors rendered obvious over the combined teachings of Niimi'633, Chambers, and Hashimoto and over the combined teachings of Tamoto and Hashimoto.

Accordingly, the rejections set forth in paragraphs 10-16 stand.

Applicants do not assert that the instantly claimed photoreceptors provide "unexpected" results over the prior art photoreceptors. Rather applicants assert that the references do not disclose the "superior properties of the claimed

photoreceptors" as shown in the examples in Table 2 of the instant specification.

However, as discussed supra, the reasons for combining the references do not have to be those of applicants. Furthermore, the showing in the instant specification is insufficient to show that the instantly claimed invention yields unexpectedly "superior" results.

The showing in examples 1, 3, 5-7 and 16 in amended Table 2 of the specification filed on Nov. 13, 2007, are not commensurate in scope within instant independent claims 1 and 28 because the photoreceptors in those examples do not comprise an intermediate layer having a surface roughness Rz that satisfies the surface roughness - particle size relationships recited in instant claims 1 and 28. Rather, examples 1, 3, 5-7 and 16 exemplify photoreceptors that comprise an electroconductive substrate having a particular surface roughness Rz and no intermediate layer.

The showing in the instant specification does not appear to provide a probative comparison to Niimi'633 or Tamoto.

Niimi'633 exemplifies a photoreceptor that exhibits stable charging properties, i.e., residual potential properties, and that provides images with "good" image qualities. See Niimi'633, Table 2 at page 28, example 6. The Niimi'663

photoreceptor comprises an electrically conductive substrate, an intermediate layer, a CGL comprising a particular azo pigment, a CTL formed using THF, and a particular protective layer.

Tamoto exemplifies photoreceptors that exhibit stable residual potential properties after 10,000 copies, and that provide images with “good” image qualities after 50,000 copies. See Tamoto, Table 2 at page 60, examples 32 and 35. The Tamoto photoreceptors comprise an electrically conductive substrate, an intermediate layer, a CGL comprising a titanyl phthalocyanine having an X-ray diffraction spectrum that appears to meet the spectrum according to Figure 13 recited in the instant claims 1 and 28 and a polyvinyl butyral binder resin, a CTL formed using toluene, and a particular protective layer.

None of the comparative examples 1-8 and 8A to 13A appear to exemplify the photoreceptors disclosed by the prior art.

Furthermore, applicants in the response filed on Jul. 12, 2007, page 24, state, “Niimi’633 is similar to Reference examples 1 and 2 of the present application.” Applicants state that “[r]eference examples 1 and 2 are comparative examples in view of the concept of the present invention.” Reference examples 1 and 2 exemplify photoreceptors that are the same as example 1, but comprise CTL’s made from a halogenated solvent. As noted by applicants, those photoreceptors exhibit good

performance. The examiner notes that those photoreceptors exhibit the same or similar results in image quality and potential properties, e.g., photosensitivity, as exhibited by the photoreceptors in examples 2, 4, 14, and 15, which comprise charge transport layers made by the non-halogenated solvent tetrahydrofuran. See amended Table 2 of the instant specification filed on Nov. 13, 2007. Thus, based on applicants' comments, the instant claimed photoreceptor does not appear to provide unexpected results over the prior art.

Accordingly, for the reasons discussed above and in the rejections in paragraphs 10-16 above, the prior art rejections stand.

Applicants further assert that none of the cited references in the rejections set forth in paragraphs 10-16 discloses or suggests the instantly claimed photoreceptor as recited in instant claims 32 and 33. Applicants further assert that none of references discloses or suggests the advantages sought by applicants.

Applicants' assertions are not persuasive. For the reasons discussed in paragraph 17, the combined teachings of the cited references renders obvious electrophotographic photoreceptors that meet all of the compositional, particle size, and surface roughness limitations recited in instant claims 32 and 33. As

discussed in paragraph 17 above, Ishii teaches a photoconductor comprising an aluminum drum having a surface roughness Rz and no intermediate layer, which meets the "no intermediate layer" limitation recited in instant claims 32 and 33. In addition, the reasons for combining the references do not have to be those of applicants. For the reasons discussed in the rejection in paragraph 17 above, JP’538 and Hashimoto provide reason, suggestion, and motivation to make and use a charge generation layer coating solution comprising the titanyl phthalocyanine pigment as taught by JP’538 and a polyvinylbutyral resin in amounts taught by Ishii, as taught by Hashimoto, such that the resultant pigment dispersoids have an average particle size of about 0.1 to 0.3 µm, such as 0.15 or 0.18 µm. Chambers provides reason, suggestion, and motivation to use a charge transport layer formed from a non-halogenated solvent. Tamura provides reason, suggestion, and motivation to use a charge transport layer comprising a charge transporting polymer formed from a non-halogenated solvent.

Accordingly, the rejection set forth in paragraph 17 stand.

Applicants do not assert that the instantly claimed photoreceptors provide “unexpected” results over the prior art photoreceptors. Rather applicants assert that the references do not disclose the “superior properties of the claimed

photoreceptors" as shown in the examples in Table 2 of the instant specification.

However, as discussed supra, the reasons for combining the references do not have to be those of applicants. Furthermore, the showing in the instant specification is insufficient to show that the instantly claimed invention yields unexpectedly "superior" results.

The showing in examples 2, 4, 14, and 15 in amended Table 2 of the specification filed on Nov. 13, 2007, are not commensurate in scope within instant independent claims 32 and 33 because the photoreceptors in those examples comprise an intermediate layer, which is outside the scope of instant claims 32 and 33.

The showing in the instant specification does not appear to provide a probative comparison to Ishii.

Ishii teaches a photoconductor that provides images without black dots, interference fringes, and ghosts. See Ishii, Table 1 at page 18, example 1. The Ishii photoconductor comprises an electrically conductive substrate having a 10-point average surface roughness Rz of 1.3 µm, a maximum height RmaxD of 2.53 µm, an arithmetic-mean roughness Ra of 0.23 µm, and an unevenness average distance Sm of 34 µm, a CGL comprising a charge generating pigment in an amount of more than 2 parts by

weight and not more than 5 parts by weight based on 1 part by weight of a binder resin, and a charge transport layer. Ishii teaches that its electrophotographic substrate having the particular surface roughness parameters and its charge generation layer comprising the charge generation pigment and binder resin in the particular weight ratio are critical elements to its invention. Paragraphs 0011 and 0012.

None of the comparative examples 1-8 and 8A to 13A appear to exemplify the photoconductor disclosed by the prior art.

Accordingly, for the reasons discussed above and in the rejection in paragraph 17 above, the prior art rejection stands.

19. The following rejections are provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

20. Claims 1, 7-22, 28, 32, and 33 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-4, 8-10, 12-18, and 20-26 of copending Application No. 10/804,067 (Application'067), as evidenced by applicants' admission II, by that portion of the disclosure in Application'067 that supports

the claimed subject matter in claims 1-4, 8-10, 12-18, and 20-26 of Application’067, and the ACS File Registry RN 26201-32-1.

The examiner notes that the rejection is based on the amended claims filed on Aug. 13, 2007, in Application’067. The examiner also notes that a Notice of allowability, covering those claims, was mailed on Nov. 20, 2007, in Application'067.

Although the conflicting claims are not identical, they are not patentably distinct from each other because the subject matter recited in the claims of Application’067 renders the subject matter recited in the instant claims obvious.

Reference claims 2 and 3, of which each depends directly from reference claim 1, recite an electrophotographic photoconductor comprising an electroconductive substrate, a charge generation layer, and a charge transport layer formed on the charge generation layer using a halogen-free solvent. The charge transport layer comprises a polycarbonate having a triarylamine structure that meets the polycarbonate resin recited in instant claim 9. The charge generation layer comprises a particular polyvinyl acetal resin and a charge generation material that has an average particle diameter smaller than the “surface roughness plane,” where the plane is the electroconductive substrate or an interlayer disposed between the substrate and the charge generation layer, recited

in reference claims 2 and 3, respectively. The "surface roughness plane" has the same meaning as "surface roughness" recited in the instant claims. Compare paragraph 4 above and Application'067, page 3, paragraph 0052. Reference claim 2 does not require the presence of an interlayer, and therefore meets the limitation of containing "no intermediate layer between" the charge generation layer and the electroconductive substrate recited in instant claims 32 and 33. Reference claim 4, which depends on reference claim 1, requires that the average particle diameter of the charge generation material be 0.3 μm or less and two-thirds or less than the surface roughness of the plane, which meets the particle size limitations recited in instant claims 1, 28, 32, and 33.

Reference claim 1 recites that the titanyl phthalocyanine crystal has an CuKα 0.1542 nm (i.e., 1.542 Angstrom) X-ray diffraction spectrum comprising a maximum diffraction peak at a Bragg angle of $27.2^\circ \pm 0.2^\circ$, a peak at a lowest Bragg angle of $7.3^\circ \pm 0.2^\circ$, and no diffraction peaks between 7.4° and 9.4°. Reference claim 8, which depends from reference claim 1, requires that the X-ray diffraction spectrum comprise no peak at a Bragg angle of 26.3°.

The subject matter recited in reference claims 1, 9, 10, and 12-18, which depend from reference claim 1, expressly meets

titanyl phthalocyanine, the product-by-process limitation, the charge transport polymer, the surface protective layer, the substrate, and the non-halogenated solvent limitations recited in instant claims 1, 7, 8, and 10-16, respectively, but for the limitation that the X-ray diffraction spectrum is that of Figure 13 of the instant specification recited in instant claims 1, 28, 32, and 33, and the chemical structure recited in instant claims 28 and 33.

However, as evidenced by the ACS File Registry RN 26201-32-1, it is well known that titanyl phthalocyanine has a chemical structure that is within the limitations of formula (1) recited in instant claims 28 and 33, when the indexes m, n, j, and k are 0. The peaks at the Bragg angles in the X-ray diffraction spectrum recited in Application'067 are within the scope of the X-ray diffraction spectrum shown in Figure 13 recited in instant claims 1, 28, 32, and 33. Furthermore, the portion of Application'067 that supports the titanyl phthalocyanine crystal recited in the reference claims teaches that such a titanyl phthalocyanine crystal has an X-ray diffraction spectrum as shown in Fig. 6 of Application'067. That diffraction spectrum appears to be identical to that shown in Figure 13. See Application'067, preparation example at pages 50-52 and Fig. 6. The differences, if any, between the

Application'067 spectrum in Fig. 6 and the spectrum in Figure 13 recited in instant claims 1, 28, 32, and 33, appear to be artifacts that may be attributed to how the diffraction spectrums were obtained or to data manipulation, e.g., using a smoothing method to remove the noise in the spectrum. The Application'067 titanyl phthalocyanine crystal in the preparation example is also obtained by process steps that appear to be the same or substantially the same as those used in synthesis example 1 of the instant specification, wherein the resultant titanyl phthalocyanine has an X-ray diffraction spectrum according to Figure 13. When addressing the question of whether a claim in an application defines an obvious variation of an invention claimed in a patent, "those portions of the specification which support the patent claims may be also be examined and considered." See MPEP 804,II.B.1, p. 800-22, citing In re Vogel, 164 USPA 619, 622 (CCPA 1970). Thus, it is reasonable to presume that the titanyl phthalocyanine crystal recited in the reference claims of Application'067 has the chemical structure recited in instant claims 28 and 33 and has an X-ray diffraction spectrum as shown in Application'067 Fig. 6 that appears to be identical to that in Figure 13 recited in instant claims 1, 28, 32, and 33. The burden is on applicants to prove otherwise. Fitzgerald, supra.

References 20 and 22-26 recite an image forming apparatus comprising an image forming unit that comprises a charging unit, a light-irradiating unit, a developing unit, and a transferring unit that meet the charging, light-irradiating unit, developing unit, and transporting unit limitations recited in instant claims 17 and 19-22. Reference 21, which depends on reference claim 20, further requires that the image forming apparatus comprise a plurality of image forming units, thus meeting the apparatus limitation recited in instant claim 18. The apparatus recited in the claims of Application’067 comprises a photoconductor as recited in reference claim 1.

It would have been obvious for a person having ordinary skill in the art, in view of the subject matter recited in the claims of Application’067, as evidenced by applicants’ admission II, by that portion of the disclosure in Application’067 that supports the claimed subject matter in claims of Application’067, and the ACS File Registry RN 26201-32-1, to make and use an electrophotographic photoconductor that meets the photoreceptor limitations recited in the instant claims, and to use the resultant photoconductor in the imaging apparatus recited in Application’067. That person would have had a reasonable expectation of successfully obtaining an electrophotographic photoconductor and an imaging apparatus that

could be used successfully in an electrophotographic process to form toner images.

21. Claims 1, 8-10, 15-18, 20-23, and 28 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-15 of copending Application No. 10/656,280 (Application’280), as evidenced by applicants’ admission in synthesis examples 1 and 8 of the instant specification (applicants’ admission III), by that portion of the disclosure in Application’280 that supports the claimed subject matter in claims 1-15 of Application’280, and by the ACS File Registry RN 26201-32-1, in view of Takaya and US 4,734,348 (Suzuki). The rejection is based on the amended claims filed on Aug. 6, 2007, in Application’280.

Reference claim 8, which depends from claim 7, which in turn depends from reference claim 1, recites an image forming apparatus comprising an electrophotographic photoreceptor comprising an electroconductive substrate, a charge generation layer, and a charge transport layer formed on the charge generation layer using the non-halogen solvent of cyclic ethers or aromatic hydrocarbons. The charge transport layer meets the charge transport layer limitations recited in instant claims 1, 16, and 28. The charge generation layer comprises titanyl

phthalocyanine crystals. The titanyl phthalocyanine crystal has an CuKα 1.542 Angstrom X-ray diffraction spectrum comprising a maximum peak at a Bragg angle of 27.2° ± 0.2° and a peak at a lowest Bragg angle of 7.3° ± 0.2° and peaks at 9.4° ± 0.2° and 9.6° ± 0.2°. No diffraction peak is observed within a range of from 7.4° to 9.3°. Reference claim 2, which depends from claim 1, requires that the X-ray diffraction spectrum comprise no peak at a Bragg angle of 26.3°.

The claims of Application'280 do not recite that the titanyl phthalocyanine crystal has the chemical structure in formula (1) recited in instant claim 28. Nor do the claims of Application'280 recite that the titanyl phthalocyanine crystal has an X-ray diffraction spectrum according to Figure 13 of the instant specification as recited in instant claims 1 and 28. However, as evidenced by the ACS File Registry RN 26201-32-1, it is well known that titanyl phthalocyanine has a chemical structure that is within the limitations of formula (1) recited in instant claim 28, when the indexes m, n, j, and k are 0. The peaks at the Bragg angles in the X-ray diffraction spectrum recited in Application'280 are within the scope of the X-ray diffraction spectrum shown in Figure 13 recited in instant claims 1 and 28. Furthermore, the portion of Application'280 that supports the titanyl phthalocyanine crystal recited in the

reference claims teaches that such a titanyl phthalocyanine crystal has an X-ray diffraction spectrum as shown in Fig. 9 of Application'280. That diffraction spectrum appears to be identical to that shown in Figure 13. See Application'280, synthesis example 1 at pages 84-85, example 1 at pages 93-94, synthesis example 8 at pages 90-92, and Fig. 9. The differences, if any, between the Application'280 spectrum in Fig. 9 and the spectrum in Figure 13 recited in instant claims 1 and 28, appear to be artifacts that may be attributed to how the diffraction spectrums were obtained or to data manipulation, e.g., using a smoothing method to remove the noise in the spectrum. The Application'280 titanyl phthalocyanines in synthesis examples 1 and 8 are also obtained by process steps that appear to be the same or substantially the same as those used in synthesis examples 1 and 8 of the instant specification, wherein the resultant titanyl phthalocyanines have an X-ray diffraction spectrum according to Figure 13. When addressing the question of whether a claim in an application defines an obvious variation of an invention claimed in a patent, "those portions of the specification which support the patent claims may be also be examined and considered." See MPEP 804,II.B.1, p. 800-22, citing In re Vogel, 164 USPA 619, 622 (CCPA 1970). Thus, it is reasonable to presume that the titanyl

phthalocyanine crystal recited in the reference claims of Application'280 has the chemical structure recited in instant claim 28 and has an X-ray diffraction spectrum as shown in Application'280 Fig. 9 that appears to be identical to that in Figure 13 recited in instant claims 1 and 28. The burden is on applicants to prove otherwise. Fitzgerald, supra.

Reference claim 3, which depends from reference claim 1, requires that the titanyl phthalocyanine crystals have an average primary particle size of less than 0.3 μm, which is within the particle size limitation recited in instant claims 1 and 28. Reference claim 4, which depends from reference claim 1, requires that the charge transport layer comprise a polycarbonate having, on the main chain and/or side chain thereof, a triarylamine structure, which meets the charge transport polymer limitations recited in instant claim 9. Reference claim 5, which depend from reference claim 1, requires that the photoreceptor further comprise a protective layer that meets the surface protective layer limitations recited in instant claim 10. Reference claim 9, which depends on reference claim 1, requires that the conductive substrate comprise an oxide film formed by anodization. The anodized oxide film meets the substrate limitation recited in instant claim 15.

Reference claims 1 and 11-15 recite that the image forming apparatus further comprises a charging unit, a light-irradiating unit, a developing unit, and a transferring unit that meet the charging, light-irradiating unit, developing unit, and transporting unit limitations recited in instant claims 17 and 20-22. Reference claim 10, which depends on reference claim 1, further requires that the image forming apparatus comprise a plurality of image forming units, thereby meeting the apparatus limitation recited in instant claim 18. Reference claim 15, which depends from reference claim 1, further requires that the apparatus comprise a detachable cartridge comprising the photoreceptor and a member selected from the group consisting of a charger, an irradiator, and a developer, which meets the unit limitations recited in instant claim 23.

Instant claim 8 is written in product-by-process format. The reference claims do not recite that the titanyl phthalocyanine material is obtained by the method recited in instant claim 8. However, the titanyl phthalocyanine material recited in the claims of Application'280 exhibits an X-ray diffraction spectrum that appears to be identical to the spectrum in Figure 13 recited in instant claims 1 and 28, and the particle size limitation of "not greater than 0.3 µm" recited in instant claims 1 and 28. Therefore, it appears that

the titanyl phthalocyanine material recited in the claims of Application’280 is the same or substantially the same as the instantly recited titanyl phthalocyanine crystal made by the process steps recited in the instant claim. The burden is on applicants to prove otherwise. Marosi; Thorpe; MPEP 2113.

The reference claims do not recite the presence of an intermediate layer located between the electroconductive substrate and the charge generation layer having a surface roughness as recited in the instant claims.

Takaya teaches the benefits of using of a particular intermediate layer located between the charge generation layer and the electroconductive substrate of an electrophotographic photosensitive member, which has a 10-point surface roughness Rz of 0.5 µm. The discussion of Takaya in paragraph 10 above is incorporated herein by reference.

When the Takaya intermediate layer is used in the photoreceptor recited in the reference claims of Application’280, as evidenced by applicants’ admission III, by that portion of the disclosure in Application’280 that supports the claimed subject matter in claims of Application’280, and the ACS File Registry RN 26201-32-1, the resultant photoreceptor satisfies the surface roughness - particle size relationships recited in instant claims 1 and 28. As discussed supra, the

titanyl phthalocyanine crystal particles in the charge generation layer recited in the reference claims of Application'280 have an average primary particle diameter of less than 0.3 μm. The average primary particle diameter of less than 0.3 μm is smaller than the Takaya undercoat layer 10-point surface roughness of 0.5 μm and is also not greater than 2/3 of the roughness of 0.5 μm (i.e., 0.33 μm), as recited in instant claims 1 and 28.

It would have been obvious for a person having ordinary skill in the art, in view of the subject matter recited in the reference claims in Application'280, as evidenced by applicants' admission III, by that portion of the disclosure in Application'280 that supports the claimed subject matter in claims of Application'280, and the ACS File Registry RN 26201-32-1, and the teachings in Takaya, to use the intermediate layer taught by Takaya having a 10-point surface roughness Rz of 0.5 μm between the electroconductive substrate and the charge generation layer in the photoreceptor recited in the reference claims of Application'280, wherein the titanyl phthalocyanine crystals have an average primary particle size of less than 0.3 μm, and the charge transport layer is formed from a non-halogen solvent. That person would have had a reasonable

expectation of successfully obtaining an electrophotographic photoreceptor, an image forming apparatus, and a process cartridge that prevent the occurrence of interference fringes and exhibit excellent potential characteristics and image forming characteristics free from difficulties over a variety of temperature and humidity environment conditions as disclosed by Takaya.

The reference claims also do not recite that the charge generation layer comprises a polyvinyl acetal binder resin.

Suzuki discloses a polyvinyl acetal resin that meets the limitations recited in instant claims 1, 17, 23, and 28. See Example 11 at col. 13. Suzuki discloses that the polyvinyl acetal resin can be used as the binder resin in a single photosensitive layer or in a charge generation layer. Col. 4, lines 10-13. Suzuki discloses that said polyvinyl acetal resin provides photosensitive layers having stably dispersed photoconductive particles and excellent electric properties, such as high sensitivity and low residual potential. Col. 2, lines 10-15, and col. 11, lines 56-60.

It would have been obvious for a person having ordinary skill in the art, in view of subject matter recited in the reference claims of Application’280 and the teachings of Suzuki, to use the Suzuki polyvinyl acetal resin as the binder resin in

the charge generation layer in the photoreceptor rendered obvious over the subject matter recited in the reference claims of Application’280, as evidenced by applicants’ admission III, by that portion of the disclosure in Application’280 that supports the claimed subject matter in claims of Application’280, and the ACS File Registry RN 26201-32-1, combined with the teachings of Takaya. That person would have had a reasonable expectation of successfully obtaining a stable titanyl phthalocyanine dispersion and a photoreceptor, an image forming apparatus, and a process cartridge that have excellent electric properties, such as high sensitivity and low residual potential, as disclosed by Suzuki.

22. Applicants’ arguments filed on Nov. 13, 2007, as applicable to the rejections in paragraphs 20 and 21 above, have been fully considered but they are not persuasive.

Applicants request that the examiner withdrawn the provisional rejections if they are the only remaining rejections in the case, referencing MPEP 822.01.

However, the provision rejections are not the only remaining rejections in the case. Furthermore, as noted in paragraph 20 above, a Notice of allowability was mailed on Nov. 20, 2007, in Application 10/804,067 (Application’067).

Therefore, prosecution is closed in that application. In addition, because the provisional double patenting rejection over the claims of the instant application in Application’067 was the only remaining issue in that application, the provision rejection was withdrawn. The applicants in Application’067, which include two inventors of the instant application, were aware of that withdrawal of the provisional rejection and that the provisional rejection in the instant application over the claims in Application’067 would be maintained or be converted to a non-provisional rejection in the instant application. See applicants’ response filed on Aug. 13, 2007, in Application’067.

Moreover, applicants did not traverse the merits of the rejections over the copending applications set forth in paragraphs 20 and 21 above.

Accordingly, the rejections stand.

23. Applicants’ amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicants are reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS

of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

24. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Janis L. Dote whose telephone number is (571) 272-1382. The examiner can normally be reached Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Mark Huff, can be reached on (571) 272-1385. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Any inquiry regarding papers not received regarding this communication or earlier communications should be directed to Supervisory Application Examiner Ms. Claudia Sullivan, whose telephone number is (571) 272-1052.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Janis L. Dote/
Primary Examiner, Art Unit 1795

JLD
Jan. 31, 2008